



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/865,165	05/24/2001	Hiroshi Harada	35498-1006	2832
7590 03/30/2005				
Mitchell P. Brook LUCE, FORWARD, HAMILTON & SCRIPPS 11988 EL CAMINO REAL SUITE 200 San Diego, CA 92130			EXAMINER MOORE JR, MICHAEL J	
			ART UNIT 2666	PAPER NUMBER

DATE MAILED: 03/30/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/865,165

Applicant(s)

HARADA ET AL.

Examiner

Michael J. Moore, Jr.

Art Unit

2666

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 24 May 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4, 8-11, 15-18 and 22 is/are rejected.
- 7) ☒ Claim(s) 5-7, 12-14 and 19-21 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 May 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 4/9/02, 2/17/04.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Information Disclosure Statement***

1. The information disclosure statements (IDS) submitted on 4/9/2002 and 2/17/2004 are in compliance with the provisions of 37 CFR 1.97. Accordingly, the examiner has considered the information disclosure statements.

### ***Drawings***

2. Figure 6 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Specification***

3. The disclosure is objected to because of the following informalities: On page 11, lines 5-7, there is some confusion as to the wording in the sentence, "To find the average of the plurality of impulse responses, the weighted average, wherein the larger...may be obtained". It appears that this sentence is confusing due to translation. Appropriate correction is required.

### ***Claim Objections***

Art Unit: 2666

4. Claims 1, 5, 8, 12, 15, and 19 are objected to because of the following informalities:

Regarding claim 1, on line 16, the phrase "the portion" should be "a portion".

Regarding claim 5, on both lines 10 and 12, the word "a" is missing before word "number".

Regarding claim 8, on line 18, the phrase "the portion" should be "a portion".

Regarding claim 12, on both lines 10 and 12, the word "a" is missing before word "number".

Regarding claim 15, on line 17, the phrase "the portion" should be "a portion".

Regarding claim 19, on both lines 11 and 13, the word "a" is missing before word "number".

Appropriate correction is required.

### ***Double Patenting***

5. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

6. Claim 1 is provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 1 of copending Application No. 10/092697. Although the conflicting claims are not identical, they are not patentably distinct from each other because of the following correspondences.

Regarding claim 1, "a receiving section which receives a resultant signal obtained by transmitting a transmission signal obtained by modulating a signal including a known signal and a data signal, and outputs the received resultant signal as a received signal" corresponds to "a reception section that receives a result of transmitting a transmission signal obtained by modulating a known signal and a data signal and outputs the result as a reception signal" of the copending application.

"An estimation section which estimates transmission path characteristics" corresponds to "a prediction section that predicts a transmission characteristic" of the copending application. "A compensation section which compensates for a portion of the received signal which corresponds to the data signal, using the transmission path characteristics, and outputs the compensated signal as a compensated data signal" corresponds to "a compensation section that compensates that portion of the reception signal which corresponds to the data signal...using a predicted portion of the transmission characteristic, and outputs the compensated portion as a compensated data signal" of the copending application.

"A demodulation section which demodulates the compensated data signal, and outputs the demodulated signal as a demodulated data signal" corresponds to "a demodulation section that demodulates the compensated data signal and outputs the

Art Unit: 2666

demodulated signal as a demodulated data signal” of the copending application. “A modulation section which modulates the demodulated data signal, and outputs the modulated signal as a modulated data signal” corresponds to “a modulation section that modulates the demodulated data and outputs the modulated signal as a modulated data signal” of the copending application.

Lastly, “wherein the estimation section compares a portion of the received signal which corresponds to the known signal with a resultant signal obtained by modulating the known signal, and compares the portion of the received signal which corresponds to the data signal with a portion of the modulated data signal which corresponds to the data signal, thereby to estimate the transmission path characteristics” corresponds to “whereby the prediction section compares that portion of the reception signal which corresponds to the known signal with a result of modulating the known signal and compares that portion of the reception signal which corresponds to the data signal with that portion of the modulated data signal which corresponds to the data signal to acquire a time series of comparison results” of the copending application.

Claim 1 of the instant application differs from claim 1 of the copending application in that claim 1 of the instant application does not claim “replaces a value in the time series of comparison results which satisfies a predetermined exclusion condition with an old value of the time series of comparison results” as well as “averages a time series of comparison results resulting from that replacement”. Therefore, claim 1 of the instant application merely broadens the scope of claim 1 of the copending application.

It has been held that the omission of an element and its function is an obvious expedient if the remaining elements perform the same function as before. See *In re Karlson*, 136 USPQ 184 (CCPA). Also note *Ex parte Rainu*, 168 USPQ 375 (Bd. App. 1969). The omission of a reference element whose function is not needed would be obvious to one skilled in the art.

A provisional obviousness-type double patenting rejection is also made to claim 8, which corresponds to claim 13 of the copending application in a similar fashion as to the rejection of claim 1 above.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

***Claim Rejections - 35 USC § 102***

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1-4, 8-11, 15-18, and 22 are rejected under 35 U.S.C. 102(b) as being anticipated by Thielecke et al. (U.S. 5,719,899) ("Thielecke"). Thielecke teaches all of the limitations of the listed claims with the reasoning that follows.

Regarding claim 1, "a receiving section which receives a resultant signal obtained by transmitting a transmission signal obtained by modulating a signal including a known signal and a data signal, and outputs the received resultant signal as a received signal" is anticipated by receiver 60 (receiving section) of Figure 5 that

Art Unit: 2666

receives signal  $y(k)$  from a transmitter. "An estimation section, which estimates transmission path characteristics" is anticipated by signal estimator 64 (estimation section) of Figure 5 that generates an estimate  $\hat{y}(k-k_0)$  of the received signal  $y(k)$ . "A compensation section which compensates for a portion of the received signal which corresponds to the data signal, using the transmission path characteristics, and outputs the compensated signal as a compensated data signal" is anticipated by adder 66 (compensation section) of Figure 5 that receives delayed input signal  $y(k-k_0)$  as well as estimate  $\hat{y}(k-k_0)$  signal from signal estimator 64 as input and generates interference reduced signal  $e(k-k_0)$  (compensated data signal).

"A demodulation section which demodulates the compensated data signal, and outputs the demodulated signal as a demodulated data signal" is anticipated by demodulator 20 of Figure 5 that receives estimated amplitude and delay signals ( $A_1$  and  $D_1$ ) from signal estimator 64. "A modulation section which modulates the demodulated data signal, and outputs the modulated signal as a modulated data signal" is anticipated by modulator 70 of Figure 6 that modulates the decision feedback bits  $b_1$  received from the feedback loop from demodulator 20 as spoken of on column 7, line 63 – column 8, line 3. Lastly, "wherein the estimation section compares a portion of the received signal which corresponds to the known signal with a resultant signal obtained by modulating the known signal, and compares the portion of the received signal which corresponds to the data signal with a portion of the modulated data signal which corresponds to the data signal, thereby to estimate the transmission path characteristics" is anticipated by signal estimator 64 of Figure 5 that receives previous bit decisions  $b_1$  from decision



Art Unit: 2666

feedback unit 63 and uses this information (comparison) with incoming signal  $y(k)$  to generate an estimate signal  $\hat{y}(k-k_0)$  (transmission path characteristics) of the received signal  $y(k)$  as spoken of on column 7, lines 36-45.

Regarding claim 2, "wherein a portion of the received signal which has not yet been compensated is compensated using a portion of the transmission path characteristics which have already been estimated" is anticipated by adder 66 of Figure 5 that uses estimate signal  $\hat{y}(k-k_0)$  along with delayed signal  $y(k-k_0)$  to generate reduced interference signal  $e(k-k_0)$  (compensated signal).

Regarding claim 3, "wherein the estimation section outputs impulse responses which are obtained by performing (a) and (b), as transmission path characteristics" is anticipated by the time-varying impulse responses spoken of on column 6, lines 48-50.

Regarding claim 4, "wherein the modulation section modulates the known signal, and outputs the modulated signal as a modulated-known signal" is anticipated by modulator 70 of Figure 6 that modulates the decision feedback bits  $b_1$  received from the feedback loop from demodulator 20 as spoken of on column 7, line 63 – column 8, line 3. Lastly, "the estimation section performs (a) and (b), using the modulated-known signal, as a resultant signal obtained by modulating the known signal" is anticipated by signal estimator of Figures 5 and 6 that provides the estimate signal  $\hat{y}(k-k_0)$  as a resultant signal.

Regarding claim 8, "receiving a resultant signal obtained by transmitting a transmission signal obtained by modulating a signal including a known signal and a data signal, and outputting the received signal as received signal" is anticipated by receiver

Art Unit: 2666

60 (receiving section) of Figure 5 that receives signal  $y(k)$  from a transmitter.

“Estimating transmission path characteristics” is anticipated by signal estimator 64 (estimation section) of Figure 5 that generates an estimate  $\hat{y}(k-k_0)$  of the received signal  $y(k)$ . “Compensating for a portion of the received signal which corresponds to the data signal, using the estimated transmission path characteristics, and outputting the compensated portion as a compensated data signal” is anticipated by adder 66 (compensation section) of Figure 5 that receives delayed input signal  $y(k-k_0)$  as well as estimate  $\hat{y}(k-k_0)$  signal from signal estimator 64 as input and generates interference reduced signal  $e(k-k_0)$  (compensated data signal).

“Demodulating the compensated data signal, and outputting the demodulated data signal as a demodulated data signal” is anticipated by demodulator 20 of Figure 5 that receives estimated amplitude and delay signals ( $A_1$  and  $D_1$ ) from signal estimator 64. “Modulating the demodulated data signal, and outputting the modulated signal as a modulated data signal” is anticipated by modulator 70 of Figure 6 that modulates the decision feedback bits  $b_1$  received from the feedback loop from demodulator 20 as spoken of on column 7, line 63 – column 8, line 3. Lastly, “wherein the step of estimating the transmission path characteristics includes the steps of comparing a portion of the received signal which corresponds to the known signal with a resultant signal which is obtained by modulating the known signal, and comparing the portion of the received signal which corresponds to the data signal with a portion of the modulated data signal which corresponds to the data signal, thereby estimating the transmission path characteristics” is anticipated by signal estimator 64 of Figure 5 that receives

Art Unit: 2666

previous bit decisions  $b_1$  from decision feedback unit 63 and uses this information (comparison) with incoming signal  $y(k)$  to generate an estimate signal  $\hat{y}(k-k_0)$  (transmission path characteristics) of the received signal  $y(k)$  as spoken of on column 7, lines 36-45.

Regarding claim 9, “wherein a portion of the received signal which has not yet been compensated is compensated using a portion of the transmission path characteristics which have already been estimated” is anticipated by adder 66 of Figure 5 that uses estimate signal  $\hat{y}(k-k_0)$  along with delayed signal  $y(k-k_0)$  to generate reduced interference signal  $e(k-k_0)$  (compensated signal).

Regarding claim 10, “wherein the step of estimating the transmission path characteristics includes a step of outputting impulse responses which are obtained by performing the steps (a) and (b), as transmission path characteristics” is anticipated by the time-varying impulse responses spoken of on column 6, lines 48-50.

Regarding claim 11, “wherein the step of modulating includes a step of modulating the known signal and a step of outputting the modulated known signal as a modulated signal” is anticipated by modulator 70 of Figure 6 that modulates the decision feedback bits  $b_1$  received from the feedback loop from demodulator 20 as spoken of on column 7, line 63 – column 8, line 3. Lastly, “the step of estimating includes the steps (a) and (b), while using a resultant signal which is obtained by modulating the known signal” is anticipated by signal estimator of Figures 5 and 6 that provides the estimate signal  $\hat{y}(k-k_0)$  as a resultant signal.

Regarding claim 15, “a receiving section which receives a resultant signal obtained by transmitting a transmission signal obtained by modulating a signal including a known signal and a data signal, and outputs the received resultant signal as a received signal” is anticipated by receiver 60 (receiving section) of Figure 5 that receives signal  $y(k)$  from a transmitter. “An estimation section, which estimates transmission path characteristics” is anticipated by signal estimator 64 (estimation section) of Figure 5 that generates an estimate  $\hat{y}(k-k_0)$  of the received signal  $y(k)$ . “A compensation section which compensates for a portion of the received signal which corresponds to the data signal, using the transmission path characteristics, and outputs the compensated signal as a compensated data signal” is anticipated by adder 66 (compensation section) of Figure 5 that receives delayed input signal  $y(k-k_0)$  as well as estimate  $\hat{y}(k-k_0)$  signal from signal estimator 64 as input and generates interference reduced signal  $e(k-k_0)$  (compensated data signal).

“A demodulation section which demodulates the compensated data signal, and outputs the demodulated signal as a demodulated data signal” is anticipated by demodulator 20 of Figure 5 that receives estimated amplitude and delay signals ( $A_1$  and  $D_1$ ) from signal estimator 64. “A modulation section which modulates the demodulated data signal, and outputs the modulated signal as a modulated data signal” is anticipated by modulator 70 of Figure 6 that modulates the decision feedback bits  $b_1$  received from the feedback loop from demodulator 20 as spoken of on column 7, line 63 – column 8, line 3. Lastly, “wherein the estimation section compares a portion of the received signal which corresponds to the known signal with a resultant signal obtained by modulating

the known signal, and compares the portion of the received signal which corresponds to the data signal with a portion of the modulated data signal which corresponds to the data signal, thereby to estimate the transmission path characteristics” is anticipated by signal estimator 64 of Figure 5 that receives previous bit decisions  $b_1$  from decision feedback unit 63 and uses this information (comparison) with incoming signal  $y(k)$  to generate an estimate signal  $\hat{y}(k-k_0)$  (transmission path characteristics) of the received signal  $y(k)$  as spoken of on column 7, lines 36-45.

Regarding claim 16, “wherein the program controls the computer to function for compensating for a portion of the received signal which has not yet been compensated using a portion of the transmission path characteristics which have already been estimated” is anticipated by adder 66 of Figure 5 that uses estimate signal  $\hat{y}(k-k_0)$  along with delayed signal  $y(k-k_0)$  to generate reduced interference signal  $e(k-k_0)$  (compensated signal).

Regarding claim 17, “wherein the program controls the estimator to output impulse responses which are obtained by performing (a) and (b), as the transmission path characteristics” is anticipated by the time-varying impulse responses spoken of on column 6, lines 48-50.

Regarding claim 18, “the modulation section to modulate the known signal and output the modulated signal as a modulated-known signal” is anticipated by modulator 70 of Figure 6 that modulates the decision feedback bits  $b_1$  received from the feedback loop from demodulator 20 as spoken of on column 7, line 63 – column 8, line 3. Lastly, “the estimation section performs (a) and (b), using the modulated-known signal as a

Art Unit: 2666

resultant signal obtained by modulating the known signal” is anticipated by signal estimator of Figures 5 and 6 that provides the estimate signal  $\hat{y}(k-k_0)$  as a resultant signal.

Regarding claim **22**, “wherein the medium is a compact disk, floppy disk, hard disk, magneto-optical disk, digital video disk, magnetic tape, or semiconductor memory” is anticipated by receiver 60 containing components controllable by hardware and/or software as in known in the art.

***Allowable Subject Matter***

9. Claims **5-7, 12-14, and 19-21** are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

10. The following is a statement of reasons for the indication of allowable subject matter:

Regarding claim **5**, Thielecke teaches the receiver of claim **1**. Thielecke does not explicitly teach the use of a divider in the receiver that divides the received signal at each carrier frequency according to a multi-carrier transmission technique into groups of received signals that are used in place of the original received signal, compensated data signal, demodulated data signal, and modulated data signal.

Regarding claims **6 and 7**, these claims are further limiting to claim **5** and are thus also allowable over the prior art of record.

Regarding claim **12**, Thielecke teaches the method of claim **8**. Thielecke does not explicitly teach the use of dividing in the receiver to divide the received signal at

Art Unit: 2666

each carrier frequency according to a multi-carrier transmission technique into groups of received signals that are used in place of the original received signal, compensated data signal, demodulated data signal, and modulated data signal.

Regarding claims **13 and 14**, these claims are further limiting to claim **12** and are thus also allowable over the prior art of record.

Regarding claim **19**, Thielecke teaches the information-recording medium of claim **15**. Thielecke does not explicitly teach the use of a divider in the receiver that divides the received signal at each carrier frequency according to a multi-carrier transmission technique into groups of received signals that are used in place of the original received signal, compensated data signal, demodulated data signal, and modulated data signal.

Regarding claims **20 and 21**, these claims are further limiting to claim **19** and are thus also allowable over the prior art of record.

### ***Conclusion***

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Kadous (U.S. 2001/0036235), Li et al. (U.S. 6,795,392), and Jones, IV et al. (U.S. 6,487,253) are all references that contain material pertinent to this application.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael J. Moore, Jr. whose telephone number is (571) 272-3168. The examiner can normally be reached on Monday-Friday (8:30am - 5:00pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Seema S. Rao can be reached at (571) 272-3174. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Michael J. Moore, Jr.  
Examiner  
Art Unit 2666

mjm MM

  
**FRANK DUONG**  
**PRIMARY EXAMINER**